AD_____

MIPR NO: 95MM5525

TITLE: Assessment and Intervention for the Reduction of Adverse
Gynecologic and Obstetric Clinical Events in Naval Personnel
Aboard Ship

PRINCIPAL INVESTIGATOR(S): CPT Stephanie K. Brodine

CONTRACTING ORGANIZATION: Naval Health Research Center
                           San Diego, California 92186-5122

REPORT DATE: March 1996

TYPE OF REPORT: Final

PREPARED FOR: U.S. Army Medical Research and Materiel Command
                   Fort Detrick, Frederick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for public release; distribution
unlimited

The views, opinions and/or findings contained in this report are those
of the author(s) and should not be construed as an official Department
of the Army position, policy or decision unless so designated by other
documentation.

19970722 103

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE March 1996	3. REPORT TYPE AND DATES COVERED Final (15 Nov 94 – 31 Jan 1996)

4. TITLE AND SUBTITLE
Assessment and Intervention for the Reduction of Adverse Gynecologic and Obstetric Clinical Events in Naval Personnel Aboard Ship

5. FUNDING NUMBERS
MIPR NO: 95MM5525

6. AUTHOR(S)
CPT Stephanie K. Brodine

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Health Research Center
San Diego, California 92186-5122

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Medical Research and Materiel Command
Fort Detrick
Frederick, Maryland 21702-5012

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

Unplanned pregnancies (UPs) and sexually transmitted diseases (STDs) in active-duty women result in morbidity and high financial costs, and adversely impact combat readiness. This study ascertained the prevalence of UPs and STDs in 314 U.S. Navy enlisted women, and defined demographic and behavioral correlates for these outcomes. Urine was collected for pregnancy and chlamydia screening, and a self-report questionnaire was administered. The mean age of our study population was 25.9 years, and approximately half were married (50.6%). Most of the women were E-4 or above (69.7%) with an average of 5.3 years in the military. The average age of sexual debut was 16.8 years with a mean of 10 lifetime sexual partners; one third (36.6%) had a history of STDs. Pregnancy screening was positive in 29 (9.2%); 48% were unplanned. 23% of the sexually active women listed "no method" as their contraceptive choice. 4.2% of the cohort were positive for chlamydia infection. The majority of this subgroup reported having a new sex partner in the last six months (57%) and 43% had multiple partners in the last six months. Demographic and behavioral correlates can be determined for this high-risk population, and noninvasive, urine-based screening can be applied to identify and treat asymptomatic infection as well as to target prevention efforts.

14. SUBJECT TERMS
Defense Women's Health
Sexually Transmitted Diseases, Chlamydia
Unplanned Pregnancies

15. NUMBER OF PAGES
28

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT Unlimited

Standard Form 298 (Rev. 2-89)

FOREWORD

Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the US Army.

_____ Where copyrighted material is quoted, permission has been obtained to use such material.

_____ Where material from documents designated for limited distribution is quoted, permission has been obtained to use the material.

_____ Citations of commercial organizations and trade names in this report do not constitute an official Department of Army endorsement or approval of the products or services of these organizations.

_____ In conducting research using animals, the investigator(s) adhered to the "Guide for the Care and Use of Laboratory Animals," prepared by the Committee on Care and Use of Laboratory Animals of the Institute of Laboratory Resources, National Research Council (NIH Publication No. 86-23, Revised 1985).

_AR_ For the protection of human subjects, the investigator(s) adhered to policies of applicable Federal Law 45 CFR 46.

_____ In conducting research utilizing recombinant DNA technology, the investigator(s) adhered to current guidelines promulgated by the National Institutes of Health.

_____ In the conduct of research utilizing recombinant DNA, the investigator(s) adhered to the NIH Guidelines for Research Involving Recombinant DNA Molecules.

_____ In the conduct of research involving hazardous organisms, the investigator(s) adhered to the CDC-NIH Guide for Biosafety in Microbiological and Biomedical Laboratories.

PI - Signature   2/21/96

                                         Date

TABLE OF CONTENTS

Introduction

Reproductive health behaviors among young women have changed markedly since the 1960s. The most important change has been a lowering of the age of sexual debut. Today, 74% of young women have become sexually active by the age of 19 years.[1] In addition, while 91% of young women have used some form of contraception by age 19,[2] only 19% of women 15-44 years of age used a condom at last intercourse. This combination of early sexual debut and poor use of a barrier method results in two potential negative reproductive health outcomes for adolescent and young adult women: unintended pregnancies (UPs) and acquisition of sexually transmitted diseases (STDs). Thus, strategies to prevent negative reproductive health outcomes should address both UPs and STDs.

In the military the high rate of morbidity and the financial costs of UPs and STDs are amplified, particularly for women assigned to ships. Although pregnancy no longer results in discharge from the service, a pregnant service member cannot remain attached to a ship after the 20th week of gestation. Further, if a pregnancy is diagnosed on a prolonged deployment, such as a Western Pacific deployment, the individual must be evacuated to the continental United States (CONUS), without replacement. Thus, UP in women assigned to ships results in personnel loss, reassignments, and costly evacuations. The sequelae of UPs and STDs, such as pelvic inflammatory disease (PID) and ectopic pregnancy, also result in greater potential morbidity for women assigned to ships. The diagnostic modalities and treatment options for these problems, which are often subtle and potentially serious disease entities, are markedly more limited in a deployed ship's medical department. In addition, STDs can result in

5

potential mortality in the setting of ectopic pregnancy for women deployed on ships.

Chlamydia trachomatis is the most common bacterial STD to afflict Americans, with an estimated four million new cases occurring annually.[1] Because chlamydia testing and reporting is not universally done in the United States and because the accuracy of tests is highly variable, it is difficult to ascertain a true prevalence of the infection in the United States. However, the best estimates place the rate at approximately 300/100,000 cases annually, with a female to male ratio of 6:1. This gender discrepancy most likely reflects the higher frequency of asymptomatic chlamydia infections in women versus men. From a number of individual studies the prevalence of asymptomatic chlamydia infections among adolescent and young adult women screened during pelvic examinations ranges from 5-20%, with most studies reporting 10-15% infection rate.[1] The duration and significance of these asymptomatic infections remains unclear; however, in a recent study a few of the women identified as having asymptomatic chlamydia infections had progressed to PID, in the interval between screening and notification. Although limited data exist in military populations, the available information suggests similar rates. Ordnoff reported a prevalence rate of cervical chlamydial infections of approximately 10% in female Navy recruits.[3] Catterson described a prevalence of 8.2% chlamydia infections in 476 active-duty Army females who presented for routine Papanicolaou (Pap) smears.[4] Both of these authors recommended the institution of screening for chlamydia in young, active-duty women.

In summary, UPs and STDs lead to significant morbidity, costs, and administrative demands in active-duty Navy women. Yet, a limited

number of studies have been done to define precise rates and contributing factors. Even more importantly, to our knowledge, no scientific efforts are under way to design and evaluate biologic and behavioral interventions to reduce the incidence of UPs and STDs in this population.

The current study was designed to determine contraceptive use patterns and the prevalence of STDs and UPs in active-duty Navy enlisted women. Another purpose of this study was to assess the military application of a noninvasive screening test for the detection of *C. trachomatis* and *Neisseria gonorrhoeae* by ligase chain reaction (LCR). A new era in STD testing was launched with the advent of such molecular techniques that amplify target nucleic acids. Importantly, these newer tests can be performed on a sample of urine, unlike the cell culture and antigen detection techniques, which require specimens obtained from the target organ in women, the endocervix. LCR has been shown to have high sensitivity (94%) and specificity (99%) in screenings of urine for chlamydia and gonorrhea infections.[5-7] This reliable procedure, which does not require a pelvic examination for an asymptomatic woman, may be an ideal STD screening test for at-risk women.

The results of this scientific effort ultimately will contribute to the development and evaluation of biologic and behavioral interventions to decrease the incidence of STDs and UPs in active-duty enlisted women.

Methods

Selection of Study Population: To identify a study population for this cross-sectional study, the number of women assigned to all naval

7

commands based in San Diego was ascertained, and available information
related to rates of STDs and UPs in these commands was gathered.
Final selection of the study populations was made after briefings by
the research staff with the commanding officers (COs) of these
commands to ensure a receptive environment for a collaborative,
intensive study of STDs and UPs. The COs were made aware of the
requirement for confidentiality with all questionnaires and biological
data collected. Two San Diego commands, one shore-based and one
ship-based, were selected due to their large complements of enlisted
women and comparability of enlisted rates. The ship selected is a
submarine tender with approximately 30% female personnel (n = 450).
The shore-based facility is a ship's maintenance command and also has
a large complement of women (n = 150). All enlisted women at these
commands were encouraged to attend the study briefing. Approximately
300 women were enrolled from these two commands.

Enrollment Procedures: Enrollment of both the shore-based command and
the submarine tender populations was completed in October 1995. The
research staff fully briefed the participants on the requirements of
the study prior to obtaining informed consent to participate. The
participants then completed a self-report questionnaire (OPNAV Report
Control Symbol [RCS] 6200-7) that documents demographics, STD and UP
risk behaviors, contraceptive use, and STD and pregnancy history. A
medical history of the participants was obtained by a retrospective
review of all available medical records.

To ensure confidentiality a tear-off sheet with an identification
code, participant's name, and social security number was completed and
separated from the questionnaire by the participant. All written
information was handled only by the research staff.

8

Laboratory Procedures: Fifteen milliliters of blood were drawn and centrifuged, and the serum was stored for syphilis and hepatitis B virus (HBV) core antibody screening. A urine sample was collected for pregnancy, chlamydia, and gonorrhea diagnostic testing. All serologies and the urine pregnancy test were performed at the Navy Environmental Preventive Medicine Unit 5 (NEPMU-5) laboratory using standard laboratory procedures. A portion of the unspun urine was frozen to -20°C and shipped to the University of California, San Francisco (UCSF), for the chlamydia and gonorrhea testing. UCSF tested for chlamydia and gonorrhea antigen using molecular techniques (LCR) made available by Abbott Laboratories.

Follow-Up: Participants were given their laboratory results as they were made available. Each participant who had a positive lab result was contacted by phone; negative results were given either by phone or by a letter in a sealed envelope. If the participant had a positive pregnancy test, she was counseled as to the need and the appropriate procedures for beginning prenatal care at the Naval Medical Center, San Diego. For other positive results the participants were assisted in seeking gynecologic treatment at Branch Medical Clinics, Naval Station or Naval Training Center, San Diego.

Medical Record Review: Available medical records were reviewed by research staff for contraceptive use, Pap test history, and STD history. The Pap test history was obtained by documenting laboratory reports; those records that did not have any laboratory reports were counted as missing. STD history was measured either by a documented positive laboratory result or in a medical history taken by a health care provider. Contraceptive history was determined by documentation in a medical history of either prior or current use of a given method.

Statistical Analyses: Descriptive characteristics of the population were tabulated. Individual univariate statistics for chlamydia outcomes were performed by the chi-square test. A logistic regression analysis was used to evaluate the association and predictive value of the risk factors for chlamydia infection. The study population consisted of two groups: 131 from the shore-based command (approximately 87% of the command's female complement) and 183 from the subtender (approximately 41% of the ship's female complement). For the purposes of analysis, these groups were combined.

Results

Retrospective Review of Submarine Tender Pregnancy Data: A retrospective review of the pregnancy rates on the submarine tender compiled by the ship's medical department was completed by our research staff. The recorded standardized information on all pregnancies in 1994 included marital status and whether the pregnancy was planned. Approximately 516 women were assigned to the submarine tender during 1994. The 1994 pregnancy rate was 14% (n = 71); 70% (n = 50) were UPs. Of the UPs, 64% (n = 32) were single and 36% (n = 18) were married. Of the planned pregnancies (n = 21), 86% (n = 18) were married, and 14% (n = 3) were single. A similar data set was not available from the shore command.

Descriptive Analysis: Approximately 322 women were briefed on the study; a total of 314 (97.5%) subjects gave written consent to participate in the study. All (n = 314) completed the questionnaire; 299 (95.5%) provided a urine specimen; 239 (76.4%) provided a blood sample; and 15 (4.8%) did not provide either blood or urine specimens. In addition, medical records were available for review in 228 (73%) of

10

the participants. The demographic characteristics of the population revealed that the majority were Caucasian (60.8%) and more senior (E-4 or greater) in grade (69.7%), and approximately half were married (50.6%) and pursued education beyond high school (49.6%), see Table 1.

Analyses of the sexual activity and STD history reveal the mean age of first intercourse as approximately 17 years, with a mean of 9.6 lifetime partners. The majority reported currently having only one sex partner (84.7%), with approximately 15.6% admitting to multiple partners over the prior six months. Condoms are used consistently (during each sexual encounter) by only a small proportion (11.1%) and are used inconsistently (sometimes/rarely) by approximately 27.7% of the group, with 51.9% reporting that they never used condoms during the previous six months. Prior diagnosis of an STD was reported by 115 participants (36.6%), with the most common being chlamydia (23.9%), followed by venereal warts (13.1%) and herpes (7.3%) (Table 2).

In regards to birth control and pregnancy history, approximately 28% of the women report using no method of birth control; the most common method used is birth control pills (27%), followed by condoms (17.5%), and either a tubal ligation/hysterectomy or vasectomy (9%). Depo-Provera and Norplant are used by only a small number of women (9%) (Table 3). When analyses were confined to currently sexually active women (n = 291), similar proportions were defined with 27% using no method of contraception; the most common method used is birth control pills (29%), followed by condoms (19%), and either a tubal ligation/hysterectomy or vasectomy (10%). Two thirds of the population (65.9%) had a prior pregnancy, and 25 (8%) reported currently being pregnant. There was a mean of 2.0 prior pregnancies and a mean of 1.1 UPs among women who were ever pregnant (Table 4).

11

Retrospective Review of the Medical Records: A review of the 228 available records revealed that 50 (21%) of the participants had at least one abnormal Pap result with the most common being atypia (n=18), followed by squamous metaplasia (n=12). Eight participants had a history of more than one abnormal Pap documented in their medical record. Sixty-eight participants had at least one STD (30%), with the most common being chlamydia (17.6%), followed by venereal warts (10.5%) and herpes (5.3%). 52.6% of the medical records documented birth control pills as the primary method of birth control, followed by Depo-Provera (17.5%) and condoms (14.9%) (Table 5).

Pregnancy Screening: Urine pregnancy (HCG) tests were performed on 299 urine samples, with 29 positive (9.2%); 22 were known pregnancies and 7 were identified through the screening. An additional 2 women were pregnant, but they had not provided a sample, and a final subject was pregnant with a negative HCG screen, for a total of 32 current pregnancies (10.7%). Of the 32 current pregnancies, 21 were from the shore-based command and 11 were attached to the subtender for pregnancy rates of 16% and 6%, respectively. The higher rate at the shore command is reflective of the fact that this command is one to which women are assigned temporarily due to pregnancy; in addition, many women may plan a pregnancy while stationed at a shore command (75% intended pregnancy rate). The mean age of the entire group of pregnant women was 25 years, 11 (34%) were of junior paygrade, 13 (40%) were unmarried, and 7 (22%) reported a new sex partner within the previous six months. Sixteen (50%) had had prior pregnancies.

Nearly half (44%) of the current pregnancies were unplanned (women who knew they were pregnant and reported that they did not intend to become pregnant, or women unaware of their pregnancy who

12

reported that they did not want to become pregnant). The mean age of the women with UPs was 23 years, 79% were unmarried, 57% reported having a new sex partner in the previous six months, and 50% were E1-E3. The subjects' self-reported pregnancy histories are seen in Table 4.

Urine and Serology Results: Chlamydia and gonorrhea LCR tests were performed on 299 urine samples. Fourteen (4.2%) were positive for chlamydia LCR (6.9% of the shore-based command and 2.7% of the subtender command), and none of the samples were positive for gonorrhea. RPR tests for syphilis were performed on 239 blood samples and all were negative. HBV core antibody titers were positive in 5 (4.8%) of 104 blood samples from subjects enrolled from the shore-based command. There were no corresponding positive HBsAg screens in these individuals. HBV core antibody titers are pending in the shipboard population.

Descriptive Risk Factor Analysis of Chlamydia Positives: Analysis of the chlamydia-positive participants revealed their mean age was 24 years, the majority were Caucasian (57%), and 10 (71%) were unmarried. The average length of military enlistment was 4 years, 8 (57%) were of E4-E6 paygrade, and 7 (50%) had progressed past a high school education.

The prevalence of *C. trachomatis* was greater in those subjects who were younger, unmarried, and more junior (E1-E3) in paygrade. They also were more likely to have had a new sexual partner in the six months prior to the study, had more than one partner in the past six months, had sex while under the influence of alcohol, and had a sexual debut younger than 18 years of age (Table 6). Seven (21%) of these subjects reported drinking alcohol to the point of passing out or

13

vomiting in the previous one month. Significantly, the majority (n=12) had had a pelvic exam (which routinely includes chlamydia screening) in the previous 12 months. None of the subjects reported any symptoms consistent with a gynecologic infection. The most frequently used contraception in this group is no method (35.7%), followed by birth control pills (28.5%) and condoms (21.4%).

We developed a logistical model controlling for factors of paygrade, marital status, race, and age of sexual debut. After controlling for these factors, a history of prior pregnancy (O.R. 8.43; C.I. 1.43 - 49.66) and excessive alcohol use as measured by drinking alcohol to the point of passing out or vomiting (O.R. 5.20; C.I. 0.97 - 27.96) were associated with chlamydia infection. Although not statistically significant, having a new partner within the past six months and having more than one partner in the past six months was also associated with increased chlamydia infection (Table 7).

Conclusions

This cross-sectional survey of shore-based and shipboard enlisted Navy women documents a relatively high frequency of inadequate birth control and barrier protection in this population. Notably, over one quarter of sexually active women reported having no method of birth control (26.8%) , and only a small proportion (11%) reported the consistent use of condoms. Of the pregnant women, 40% were single and half of the pregnancies were unplanned. More than one third of the population reported a history of prior STDs; medical record review verified this with approximately 30% of the records reviewed documenting a history of an STD. Furthermore, 4.2% of the population had asymptomatic chlamydia infections, despite a pelvic examination

14

and chlamydia screening within the preceding year in the majority of the subjects.

The findings regarding pregnancy and single parenthood in enlisted active-duty women document a lack of progress in the area of prevention since they are similar to a survey completed several years ago.[8] In 1989, a Navywide survey found that the majority of pregnancies were unplanned (70%), among single women during their first enlistment, and that the fathers were most likely to be active-duty military (50%). A 1992 survey of active-duty women found a 7.5% pregnancy rate for ship based women and an 8.6% pregnancy rate for shore based women.[9] Of these pregnancies, almost 70% were unplanned, and only 55% of the women reported using some form of birth control. The majority of our subjects demonstrate similar behavior: 70% reported using some method of birth control, with the most common method being birth control pills (Table 4). However, after accounting for those who are pregnant or who have not been sexually active during the previous six months, a significant percentage (23%) still reported not using any form of birth control. These data are similar to those found among civilian populations in which the United States has been shown to have the highest UP rate among unmarried young adult females of any western nation. This high UP rate may be explained in part by the lack of consistent and effective use of contraception.

The early sexual debut of these subjects matches that seen in the general population: 90% of the subjects reported having their first sexual intercourse before the age of 19. The historical information (i.e. multiple lifetime partners, early sexual debut, and unprotected sex) in Table 2 reflects a high-risk population. However, the more current behavioral profile suggests that the majority of the

15

subjects are now at lower risk. Only 10.8% reported currently having more than one sexual partner, and 82% reported having had one or fewer different partners (including spouse) in the last six months. This shift in behavior (historical versus current) may be due to the fact that the majority of the subjects have completed their first enlistment, are over 22 years of age, and approximately half are married (Table 1).

This study implements, for the first time that we are aware of, noninvasive, highly sensitive and specific urine-based screening for chlamydia and gonorrhea in the military. Part of the cost-benefit analysis for the screening and treatment of chlamydial infections requires consideration of the tremendous reproductive morbidity of chlamydial infections in women. Eight percent of women with endocervical chlamydial infection also have PID.[10] It has been estimated that 30% of women with untreated chlamydia endocervical infection will develop PID.[11] Risk factors for PID parallel those for STD acquisition and include younger age, multiple sexual partners, nonbarrier contraception, IUD use, and most recently described, vaginal douching.[12] Smoking has also been associated with PID, but it may be more of a marker for other risk behaviors rather than a cause itself. Again, the single greatest risk factor for PID is unprotected sexual intercourse. Twenty-five percent of women who have had PID, most frequently due to chlamydia, develop infertility due to fallopian tube damage. This tubal damage also can result in ectopic pregnancy, which has become epidemic, in large part mirroring the chlamydia epidemic.[13] Women have a seven to ten fold increased risk for ectopic pregnancy after a single episode of PID.[14] Establishing these prevalence rates of infection will assist in appropriate cost-benefit

analyses to guide screening policies.

The overall rate of chlamydia infection in the current study population was 4.2%. Some of the characteristics of this subset are similar to those documented previously as risk factors for PID and STDs. When compared to the overall noninfected population, there was a trend for those subjects with chlamydia infection to be younger, single, and E1-E3 in paygrade (Table 6). They also were more likely to have had an earlier sexual debut, have had more than one partner in the past six months, have sex after drinking alcohol, and drink alcohol to excess (Table 6). Although they were more likely than the noninfected population to use condoms (condom use was restricted to 21% of the group), this probably reflects risky sexual behaviors in combination with the inconsistent use of condoms. A difference in the chlamydia infection rate between the shore-based command and the subtender population was found; however, it is most likely that this is due to the small numbers and less likely to be due to a difference in risk factors although this needs to be explored further. Part of this difference may be due in part to the fact that 92% of the subtender group (versus only 70% of the shore group) had a current Pap smear, and chlamydia cultures are routinely done during the annual exam.

Successful application of the LCR methodology does not necessarily endorse its widespread use as a screening tool for chlamydia infections. Recently, a decision-analysis model was applied to LCR urine-based screening in women. It was determined through hypothetical application of costs and benefits that it was cost-effective to perform routine screening if the overall prevalence rate of chlamydia infection was at least 6%.[15] However, this analysis

17

included the necessity and cost of performing an invasive pelvic examination to obtain endocervical specimens. Using a simple noninvasive urine-based test makes the LCR technique very attractive for screening large numbers of asymptomatic women and men. There are additional considerations in the military not included in the decision analysis of this civilian-based study. These include deployment with potential medical evacuations for the complications of PID and ectopic pregnancy as well as the resultant negative impact on operational readiness. It may be possible, through additional studies, to better identify high-risk subsets of women to define optimal screening strategies.

More recently, in the era of AIDS, there have been advances in the fields of behavioral medicine, health psychology, and health risk behavior change surrounding sexual behaviors. Success has been achieved with behavioral models, such as the Information, Motivation and Behavioral Skills (IMB) model, which include not only information as education, but also emphasize skills building. This IMB model was applied to the development of an intervention for the prevention of STDs in U.S. Marines on Western Pacific deployment. An evaluation of this intervention showed a decrease in risky sexual behaviors and more moderate alcohol use in those Marines enrolled in the intervention group versus control Marines on the same deployment. The current study does identify targets, such as birth control, risky sexual behaviors, and excessive use of alcohol, that could be used to design a cognitive skills-building behavioral intervention for the prevention of UPs and STDs in active-duty Navy women.

References

1. Centers for Disease Control. Recommendations for the prevention and management of *Chlamydia trachomatis* infections. MMWR, 42(12):2, 1993.

2. Irwin CE. The Health of America's Youth. Washington, DC: National Center for Education and Maternal and Child Health, 1990:31.

3. Orndorff GR. Screening for *Chlamydia trachomatis* by the direct fluorescent antibody test in female Navy recruits. Mil Med, 1991 Dec; 156(12):675-7.

4. Catterson ML, Zadoo V. Prevalence of asymptomatic chlamydial cervical infection in active duty Army females. Mil Med, 1993 Sep;158(9):618-9.5.

5. Schachter J, Stamm WE, Quinn TC, Andrews WW, Burczak JD, Lee HH. Ligase chain reaction to detect *Chlamydia trachomatis* infection of the cervix. J Clin Microbiology, 1994 Oct;32(10).

6. Lee HH, Chernesky MA, Schachter J, Burczak JD, Andrews WW, Muldoon S, Leckie G, Stamm WE. Diagnosis of *Chlamydia trachomatis* genitourinary infection in women by ligase chain reaction assay of urine. Lancet, 1995 Jan 28;345(8944):213-216.

7. Smith KR, Ching S, Lee H, Ohhashi Y, Hu H, Fisher HC, Hook EW. Evaluation of ligase chain reaction for use with urine for identification of *Neisseria gonorrhoeae* in females attending a sexually transmitted disease clinic. J Clin Microbiology, 1995 Feb;33(2):445-457.

8.   Thomas PJ, Edwards JE. <u>Incidence of Pregnancy and Single</u>
      <u>Parenthood Among Enlisted Personnel in the Navy</u>. San Diego (CA):
      Navy Personnel Research and Development Center; 1989. Report
      No.:90-1.

9.   Thomas PJ, Thomas MD, Robertson P. <u>Absences of Navy Enlisted</u>
      <u>Personnel: A Search for Gender Difference</u>. San Diego (CA): Navy
      Personnel Research and Development Center, 1993. Report No.:93-3.

10.   Westrom L, Svensson L, Wolner-Hanssen P, Mardh P-A. Chlamydia
      and gonococcal infections in a defined population of women.
      Scand J Infect Dis, 1982;<u>32</u>(suppl):157-62.

11.   Stamm WE, Guinan ME, Johnson C. Effect of treatment regimens for
      Neisseria gonorrhoeae on simultaneous infection with Chlamydia
      trachomatis. N Engl J Med, 1984;<u>310</u>:545-9.

12.   McCormack WM. Pelvic inflammatory disease. N Engl J Med, 1994
      Jan 13;<u>330</u>(2):115-119.

13.   Brunhan RC, Binns B, McDowell J, Paraskevas M. *Chlamydia*
      trachomatis infection in women with ectopic pregnancy. Obstet
      Gynecol, 1986 May;<u>67</u>(5):772-6.

14.   Bauwens JE, Clark AM, Stamm WE. Diagnosis of *Chlamydia*
      trachomatis endocervical infections by a commercial polymerase
      chain reaction assay. J Clin Microbiol, 1993 Nov; <u>31</u>(11):3023-7.

15.   Genc M, Mardh P. A cost-effectiveness analysis of screening and
      treatment for *Chlamydia trachomatis* infection in asymptomatic
      women. Ann Intern Med, 1996 Jan 1;<u>124</u>(1 pt 1):1-7.

Contract Support

The following is a list of personnel who were contract support for this study:

Barbara A. Bales	BSN, MA
Jill McMullen	BA
Priscilla Lee	BS
Dana Benas	BA

TABLE 1. **Demographic Characteristics of a Population of Navy Enlisted Women, December 1995**

	Participants (n = 314)
Age (mean, years)	25.9
Time in military (mean, years)	5.3
Paygrade	
E-1 to E-3	95 (30.3%)
E-4 to E-6	207 (65.9%)
E-7 to E-9	12 (3.8%)
Race	
White	191 (60.8%)
African-American	68 (21.7%)
Hispanic	21 (6.7%)
Asian/Pacific Islander	12 (3.8%)
American Indian	07 (2.2%)
Other	12 (3.8%)
Marital status	
Married	159 (50.6%)
Single	109 (34.7%)
Separated/Divorced	46 (14.6%)
Education level	
College	129 (41.1%)
High School	152 (48.4%)
Vocational	26 (8.2%)
Graduate	01 (0.3%)

TABLE 2.   STD and Sexual History by Self-Report in a Population of Navy Enlisted Women, December 1995

Mean age of 1st intercourse (years)	16.8
Mean number of lifetime partners	9.6

Number of partners in last six months

None	61 (19.4%)
One person	199 (63.4%)
2-3 people	38 (12.1%)
4-5 people	07 (2.2%)
6 or more	04 (1.3%)

Have only one sex partner	Yes 266 (84.7%)
Have more than one current sex partner	Yes 18 (5.7%)
New partner in the last six months	Yes 73 (23.2%)

Condom use in the last six months

Never used	163 (51.9%)
Less than 50% of time	53 (16.9%)
More than 50% of time	34 (10.8%)
Always	35 (11.1%)
No sex	27 (8.6%)

Any prior STD	Yes 115 (36.6%)

YES

Ever had		
	Syphilis	01 (0.3%)
	Gonorrhea	19 (6.1%)
	Venereal warts	41 (13.1%)
	Chlamydia	75 (23.9%)
	Herpes	23 (7.3%)
	PID	21 (6.7%)
	Other STD	30 (9.6%)

Total denominators for each variable varied slightly due to questionnaire nonresponse.

TABLE 3. **Method of Birth Control by Self-Report in a Population of Navy Enlisted Women, December 1995**

	Total Population (n=314)	Sexually Active Population (n=291)
No method	87 (27.7%)	78 (26.8%)
Birth control pills	86 (27.4%)	84 (28.8%)
Condom	55 (17.5%)	55 (18.7%)
Tubal/Hysterectomy	24 (7.6%)	23 (7.8%)
Depo-Provera	23 (7.4%)	23 (7.8%)
Withdrawal	15 (4.8%)	15 (5.1%)
Abstinence	10 (3.2%)	03 (1.0%)
Norplant	05 (1.6%)	05 (1.7%)
Diaphragm	01 (0.3%)	01 (0.3%)
Diaphragm/Spermicide	01 (0.3%)	01 (0.3%)
Diaphragm/Condom	01 (0.3%)	01 (0.3%)
Vasectomy	05 (1.6%)	05 (1.7%)

Total denominators for each variable varied slightly due to questionnaire nonresponse, as well as those who combine methods.

TABLE 4. **Pregnancy History by Self-Report in a Population of Navy Enlisted Women, December 1995**

Previous history of pregnancy	Yes No	207 (65.9%) 107 (34.1%)
Number of pregnancies	Mean =	2.0; (Range 1-9)
Number unintended	Mean =	1.1; (Range 0-7)
Currently pregnant	Yes No Don't Know	25 (08.3%) 262 (83.1%) 27 (08.6%)
Pregnant in last six months	Yes No	33 (10.5%) 279 (88.9%)

Of those whose pregnancies occurring within last six months:

Using birth control at time she became pregnant	Yes No	12 (26.7%) 32 (71.1%)
Intended to become pregnant	Yes No	25 (55.6%) 20 (44.4%)
TAD to shore command because of pregnancy	Yes No	12 (26.7%) 31 (68.9%)

Total denominators for each variable varied slightly due to questionnaire nonresponse.

TABLE 5. STD, Contraceptive and Pap History Obtained by Medical Record Review of a Population of Navy Enlisted Women, December, 1995

		Records reviewed (n = 228)	
Number with at least one abnormal Pap		50	(21%)
Type:	Chronic Cervicitis	09	(18%)
	Squamous Metaplasia	12	(24%)
	Atypia	18	(36%)
	CINI	08	(16%)
	CINII	06	(12%)
	CINIII	04	(08%)
STD history			
	Chlamydia	40	(17.6%)
	Venereal Warts	24	(10.5%)
	Other STD	13	(5.7%)
	Herpes	12	(5.3%)
	Gonorrhea	05	(2.2%)
	PID	04	(1.8%)
	Syphilis	01	(0.4%)
Contraceptive history			
	Birth Control Pills	120	(52.6%)
	Depo-Provera	40	(17.5%)
	Condom	34	(14.9%)
	Tubal Ligation	13	(5.7%)
	Norplant	08	(3.5%)
	Vasectomy	06	(2.6%)
	Hysterectomy	04	(1.8%)
	Diaphragm	03	(1.3%)
	IUD	02	(0.9%)

Total denominators for each variable varied slightly due to information available in the health records.

TABLE 6. Asymptomatic *C. trachomatis* Prevalence Rates by Associated Risk Factors in a Population of Navy Enlisted Women, December 1995.

	Percent Chlamydia Positive
Marital status	
Unmarried	6.85
Married	2.61
Paygrade	
E1 – E3	6.67
E4 – E9	3.83
Age (years)	
<25	6.54
≥25	2.74
Race	
Non-white	5.17
White	4.37
Age of 1st intercourse (years)	
<18	5.67
≥18	2.86
New partner in last six months	
Yes	10.81
No	2.67
Number of different sex partners in last six months	
>1	13.33
≤1	3.15
Ever been pregnant	
Yes	6.00
No	2.02
Drank alcohol to the point of loss of consciousness or vomiting	
Yes	18.75
No	3.91

Total denominators for each variable varied slightly due to questionnaire nonresponse.

TABLE 7. Final Logistic Regression Model for Positive *C. trachomatis* Screening in a Population of Navy Enlisted Women, December 1995.

Variable	Odds Ratio	β Estimate	95% CI
Marital status			
Married	1.00		
Unmarried	1.54	0.4334	0.35, 6.72
Paygrade			
E4 – E9	1.00		
E1 – E3	1.87	0.624	0.54, 6.45
Race			
White	1.00		
Non-white	0.77	-0.2564	0.23, 2.59
Age of 1st intercourse (years)	0.97	-0.027	0.77, 1.22
New partner in last six months	2.41	0.880	0.43, 13.52
Number of different sex partners in last six months > 1	2.14	0.759	0.42, 10.95
Ever been pregnant	8.43	2.132	1.43, 49.66
Drank alcohol to the point of loss of consciousness or vomiting	5.20	1.649	0.97, 27.96